Georgia Department of Transportation

Atlanta Regional
MANAGED LANES
Implementation Plan

Metro Atlanta
OPS
OPERATIONAL PLANNING STUDY

# MLIP / OPS Update

## Stakeholder Meeting #4

June 3, 2015

# Agenda

- OPS Overview
  - Recommendations
- MLIP Overview
  - Managed Lane Strategies
  - Operational Analysis
  - Assumptions to Inform Financial Analysis
  - Results of Financial Analysis
- Next Steps

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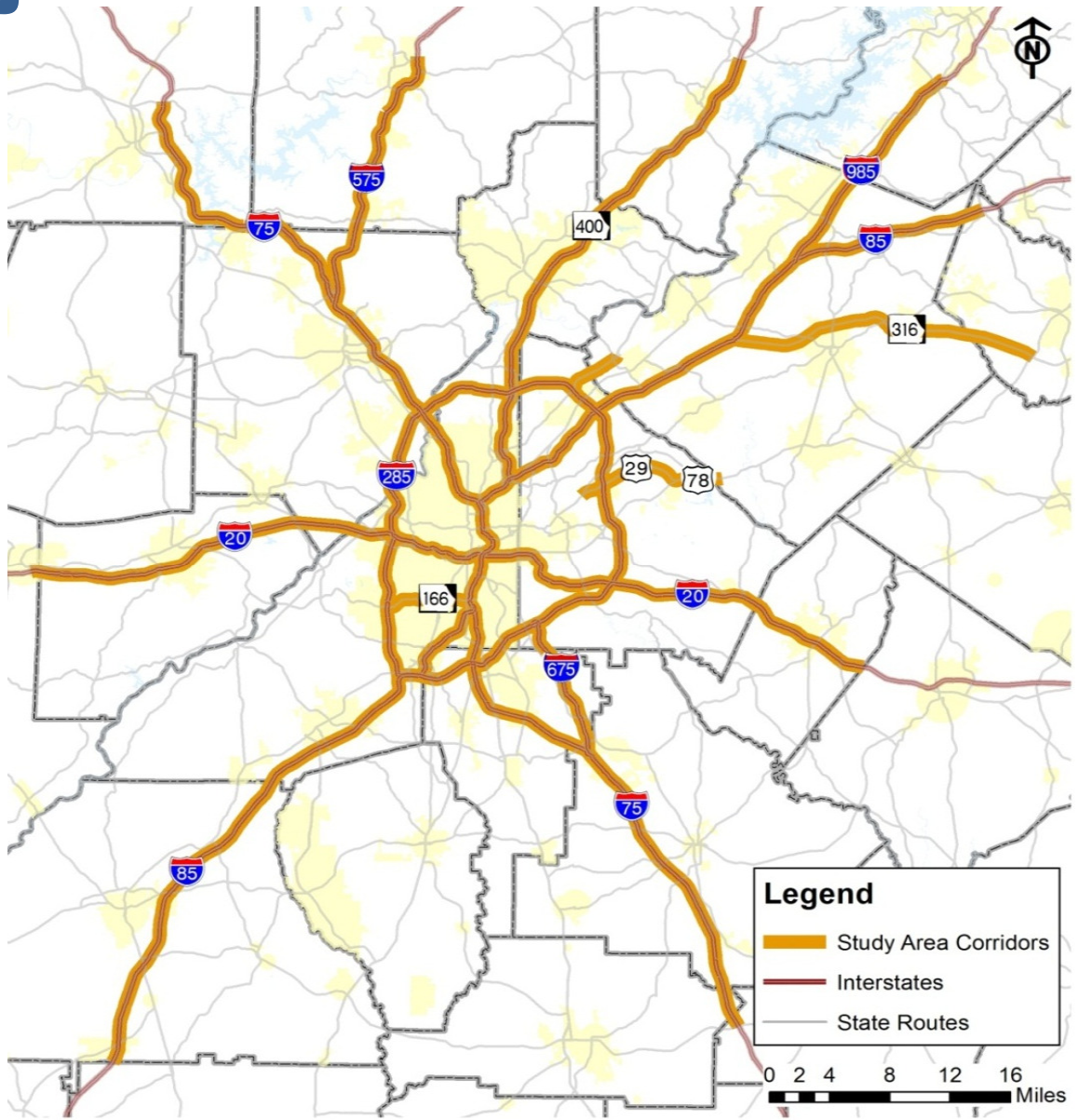
OPERATIONAL PLANNING STUDY

# OPS Overview

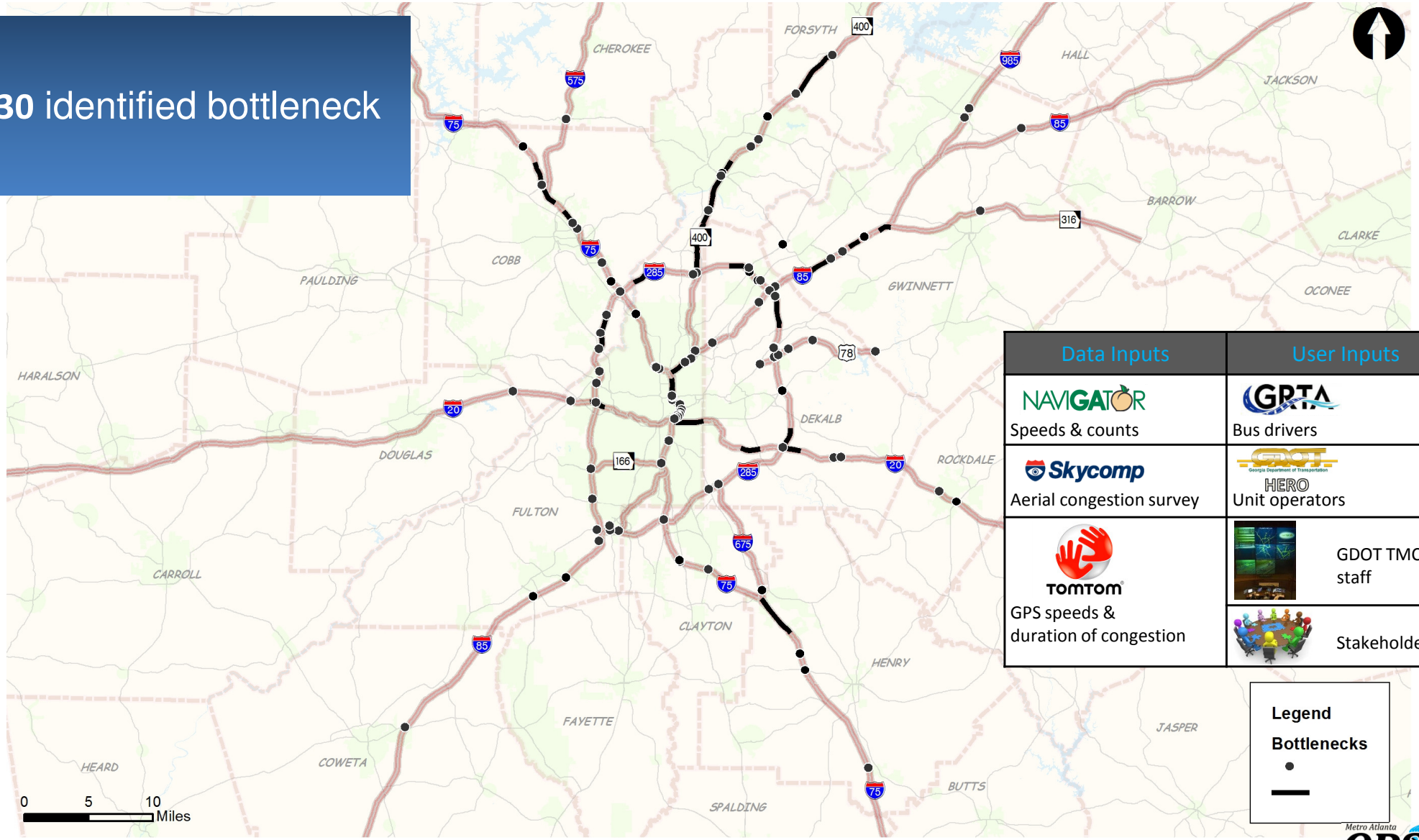
# Objectives

- Identify bottleneck areas
- Identify and evaluate potential low-cost improvements
- Quick implementation – 6 months to 5 years
- Document a prioritized list of operational projects



# Identified Bottlenecks

**130** identified bottleneck




| Data Inputs | User Inputs |
|---|---|
| NAVIGATOR Speeds & counts | GRTA Bus drivers |
| Skycomp Aerial congestion survey | GDOT HERO Unit operators |
| TOMTOM GPS speeds & duration of congestion | GDOT TMC staff |
| | Stakeholders |

**Legend**

**Bottlenecks**

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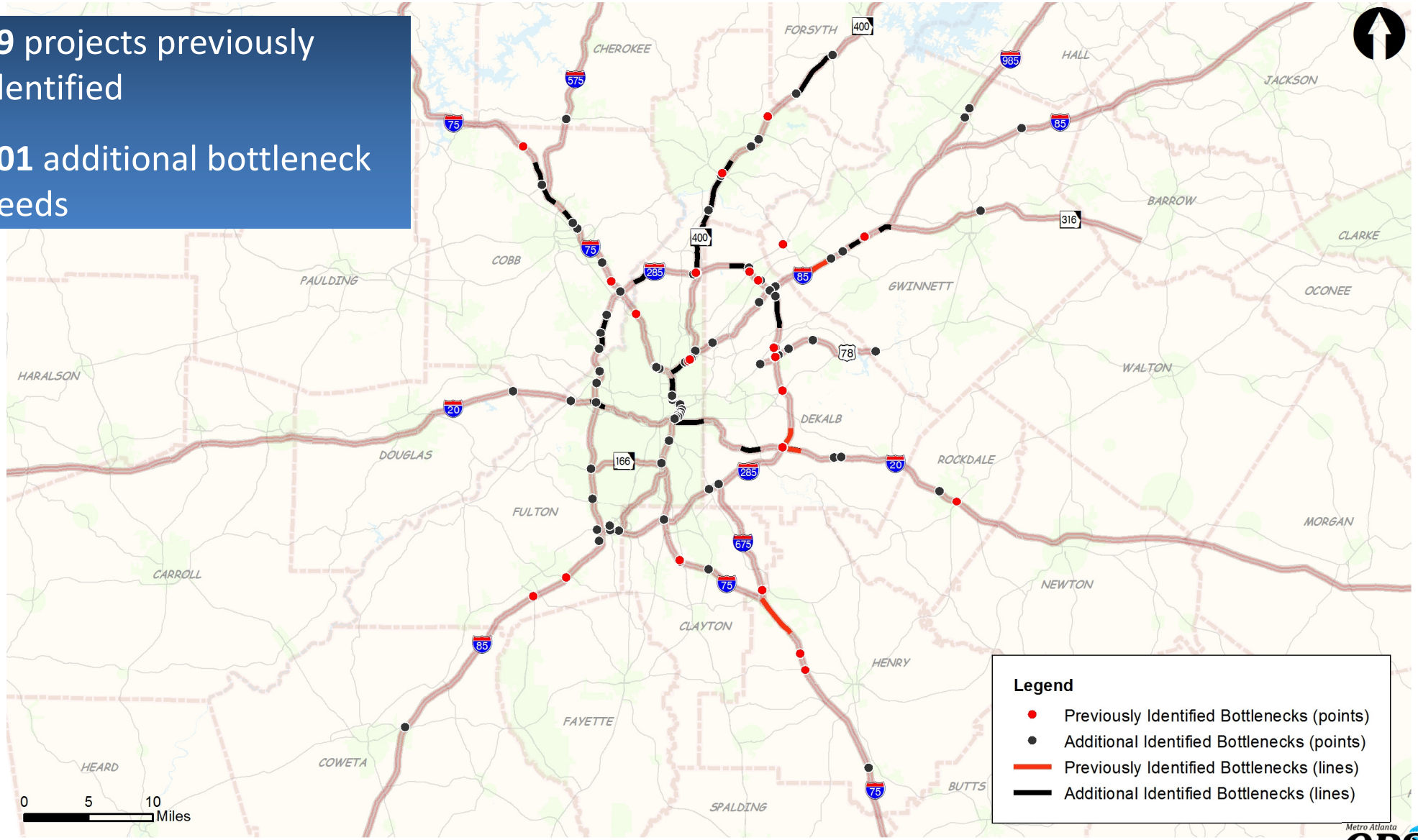
# Previously Identified Bottlenecks

**29** projects previously identified

**101** additional bottleneck needs

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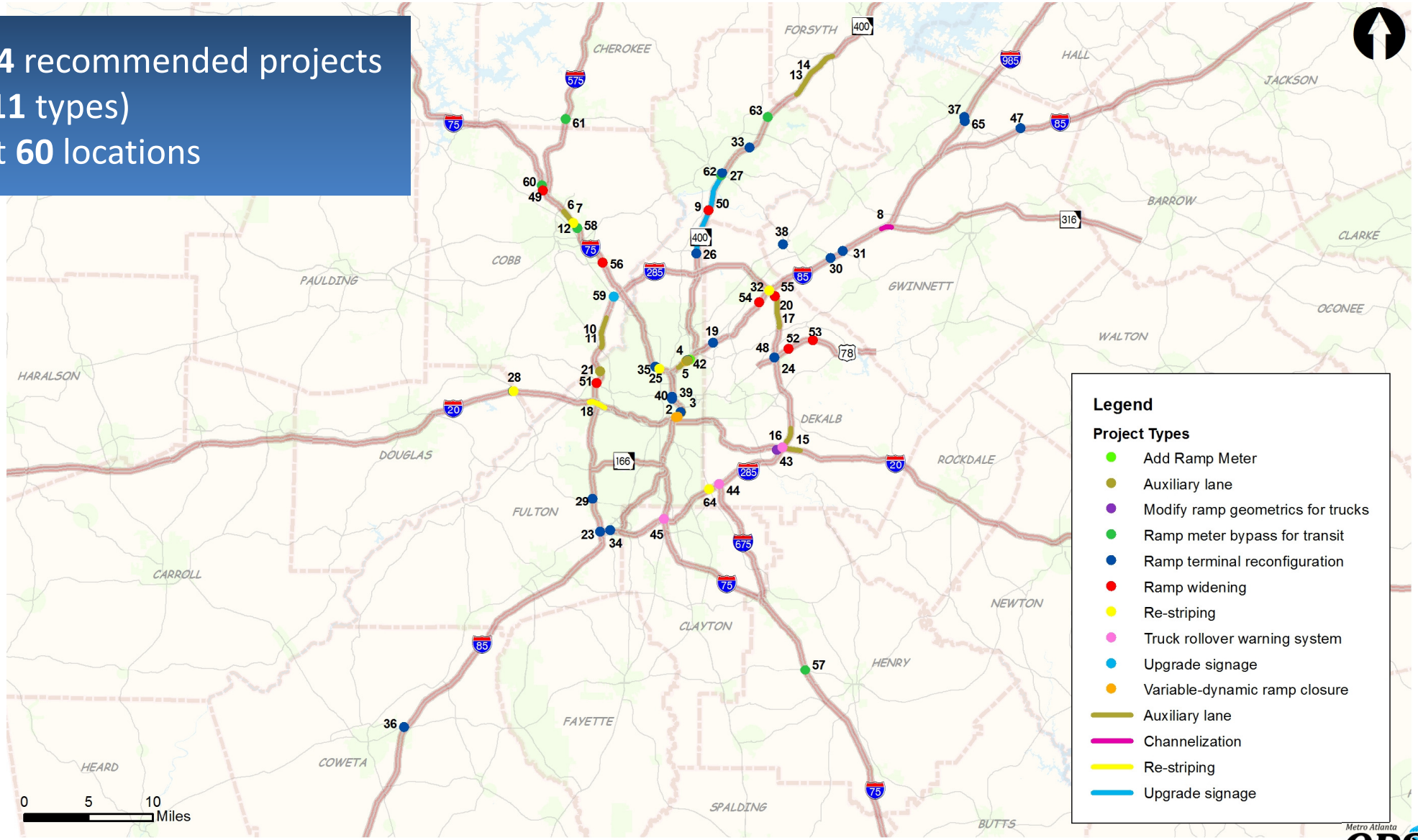
# Recommended Projects

**74** recommended projects
(**11** types)
at **60** locations

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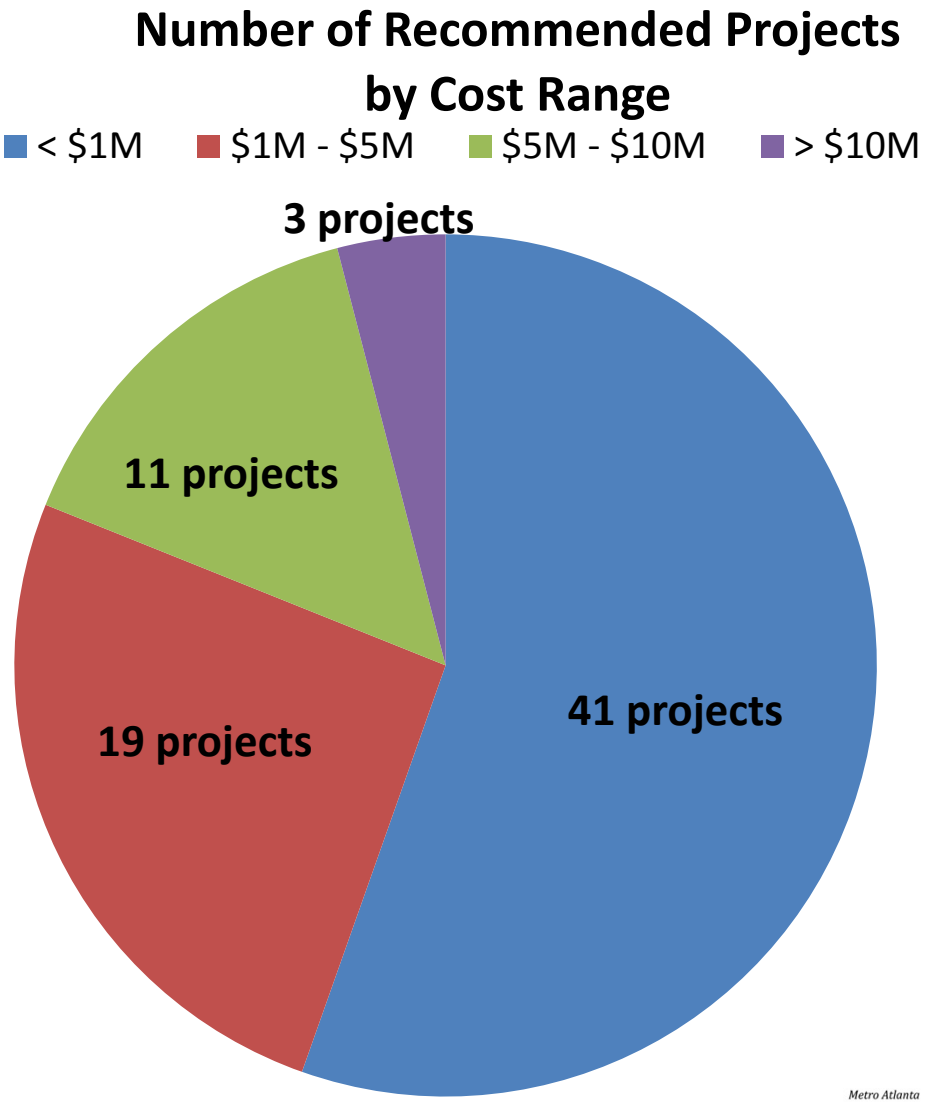
# Recommended Projects by Cost Range

- 74 projects totaling approximately $181 M



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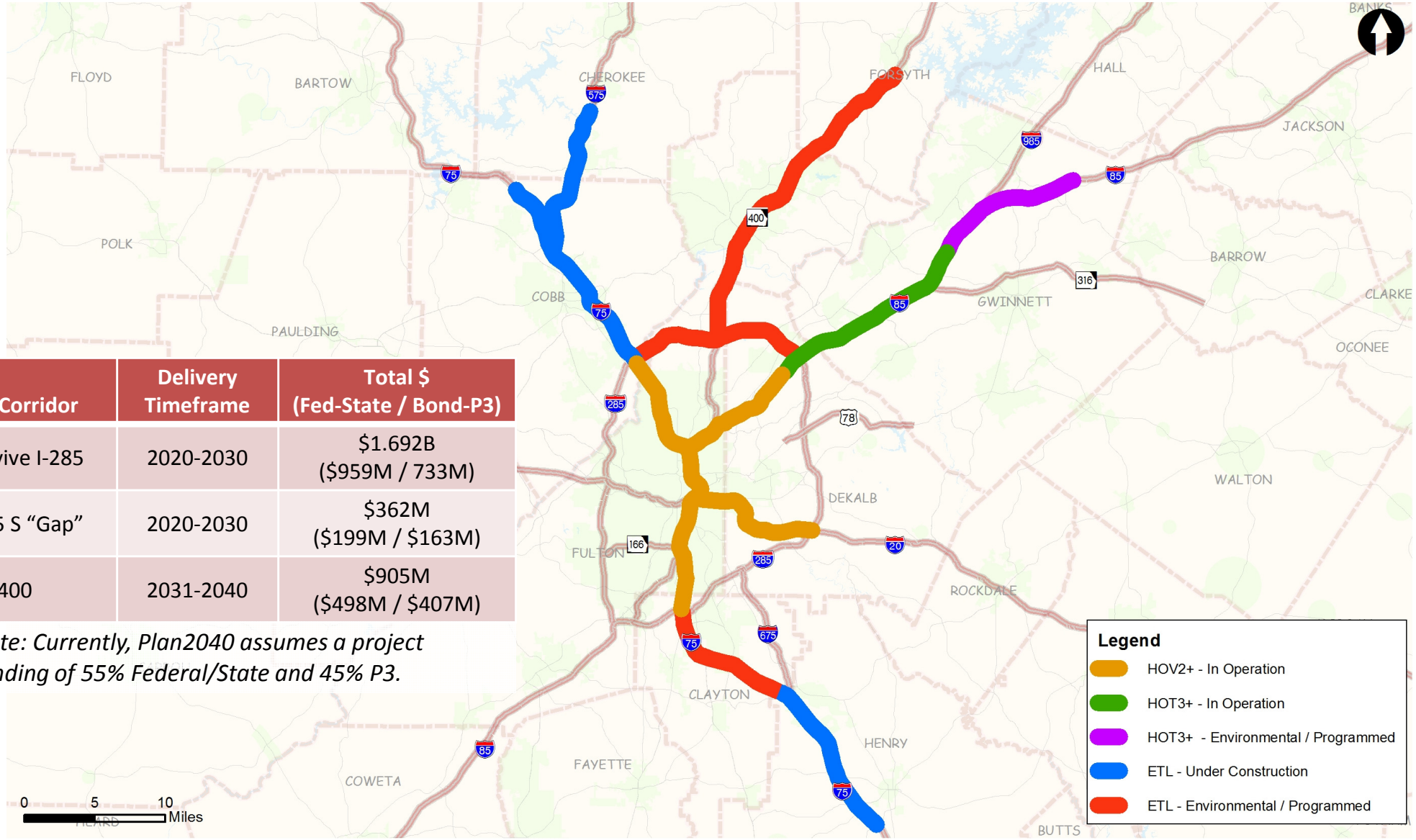
# MLIP Overview

# Managed Lane Corridors Currently in Operation or Under Development

| Corridor | Delivery Timeframe | Total $ (Fed-State / Bond-P3) |
|---|---|---|
| Revive I-285 | 2020-2030 | $1.692B ($959M / 733M) |
| I-75 S "Gap" | 2020-2030 | $362M ($199M / $163M) |
| SR 400 | 2031-2040 | $905M ($498M / $407M) |

*Note: Currently, Plan2040 assumes a project funding of 55% Federal/State and 45% P3.*



# Planning Assumptions

- All new limited access capacity in Metro Atlanta will likely be tolled
- Eliminate assumptions of long-term concession agreements
- Evaluate lower-cost managed lane treatments
- Accommodate regional transit
- Project level assumptions based on Plan2040 (Sept 2012)

# Transit Considerations

- Transit will be able to use inside (left) tolled lanes for free
- Park-and-ride lots considered in the development of access points
- GRTA bus drivers provided input on bottleneck locations and potential solutions for MLIP/OPS
- Ramp meter bypass lanes for transit recommended as part of OPS

# Managed Lane *Implementation* Plan (MLIP)

- Updating MLSP as part of Managed Lanes Implementation Plan (MLIP) to:
  - Build upon previous MLSP goals
  - Reflected funding constraints
  - Identify feasible locations for managed lane projects
- Incorporate recommendations into RTP and TIP update, as appropriate

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# Managed Lane Strategies

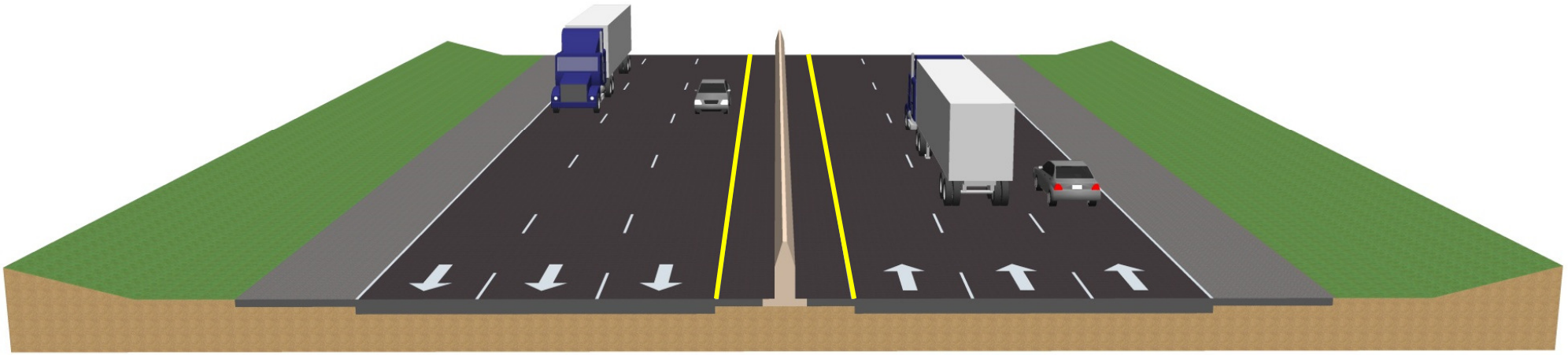
# Managed Lane Strategies

- Consider traditional priced managed lane solutions
  - New Lanes
- Consider non-traditional priced managed lane solutions
  - Dynamic Flex Lanes utilizing shoulders
  - Reversible Lanes using Moveable Barriers
- Intent is to not "reduce" current travel options for motorists

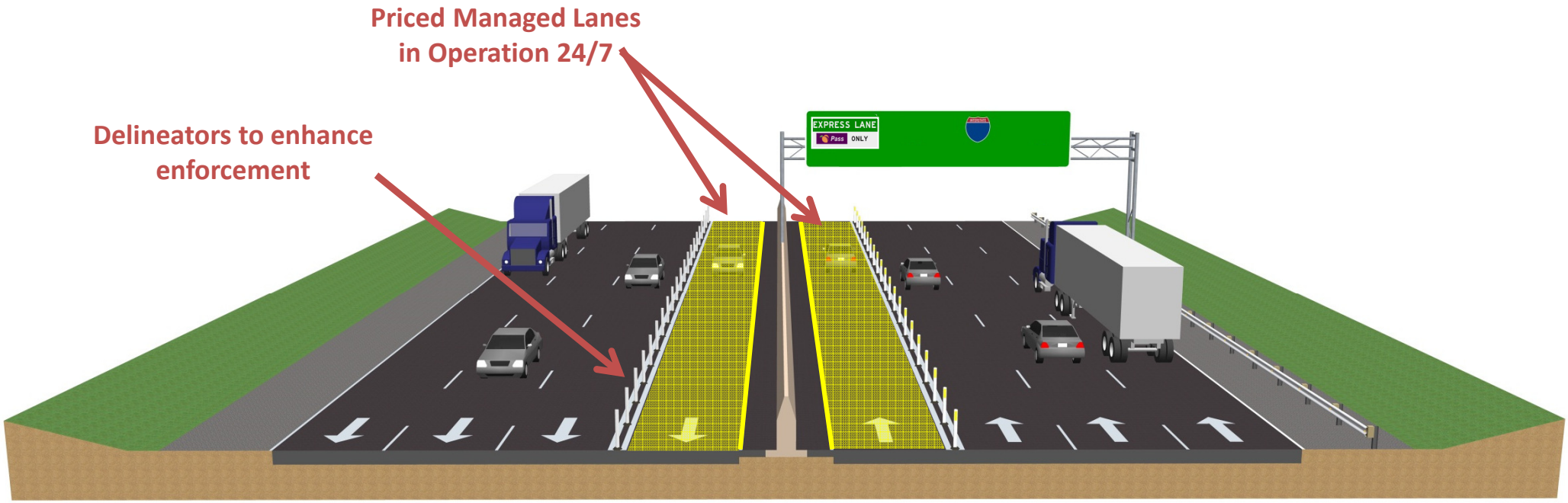
## Managed Lane Strategies

# NEW LANES

# New Lane – Typical Section
# BEFORE



# New Lane – Typical Section
# AFTER



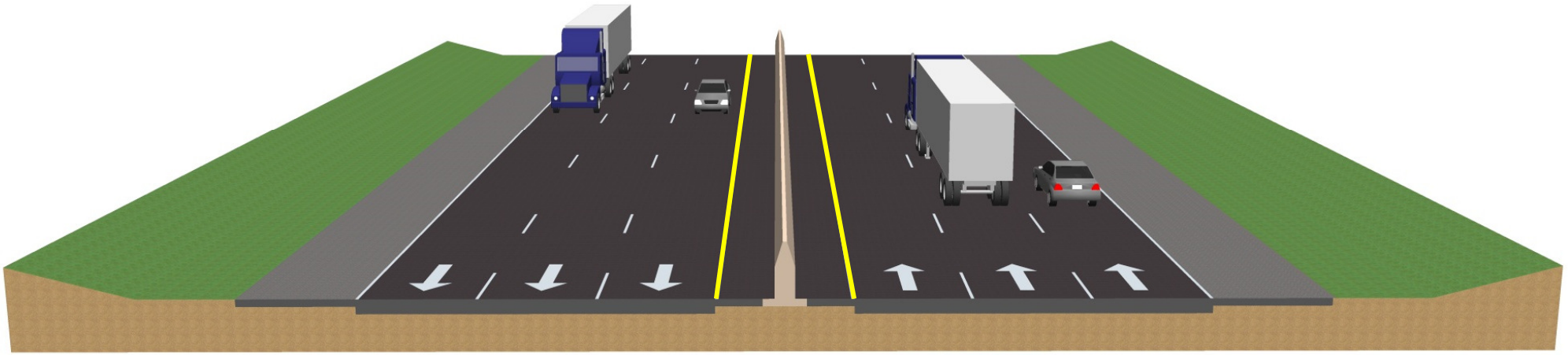
# New Lanes Characteristics

- Configurations
  - 1-Lane in each direction
  - Maintain/reduced existing lane widths to 11’ and construct a new outside lane that is 12’
  - Separation through delineators and pavement stripings
  - Access type and locations
    - Direct access ramps connecting to surrounding arterial system
    - Slip ramp access to adjacent general purpose lanes
    - Potential for system-to-system interchange
- Operations/Analysis Periods
  - Both directions
  - 24/7 operations

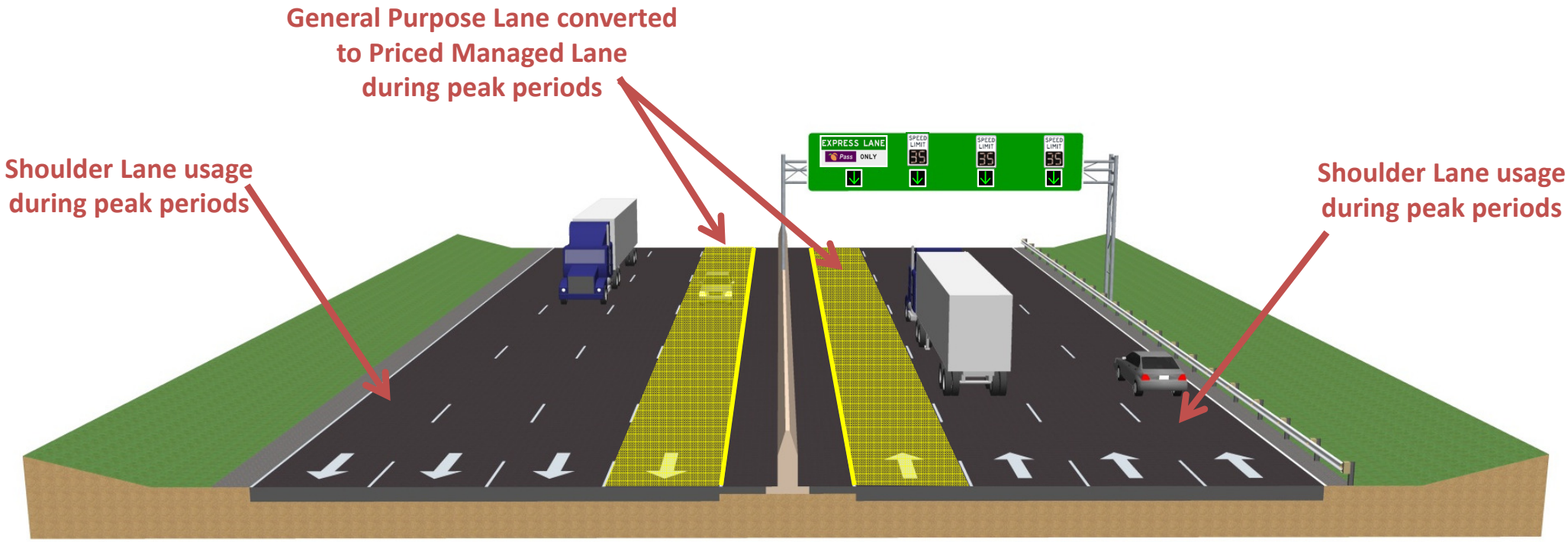
## Managed Lane Strategies

# Dynamic Flex Lanes

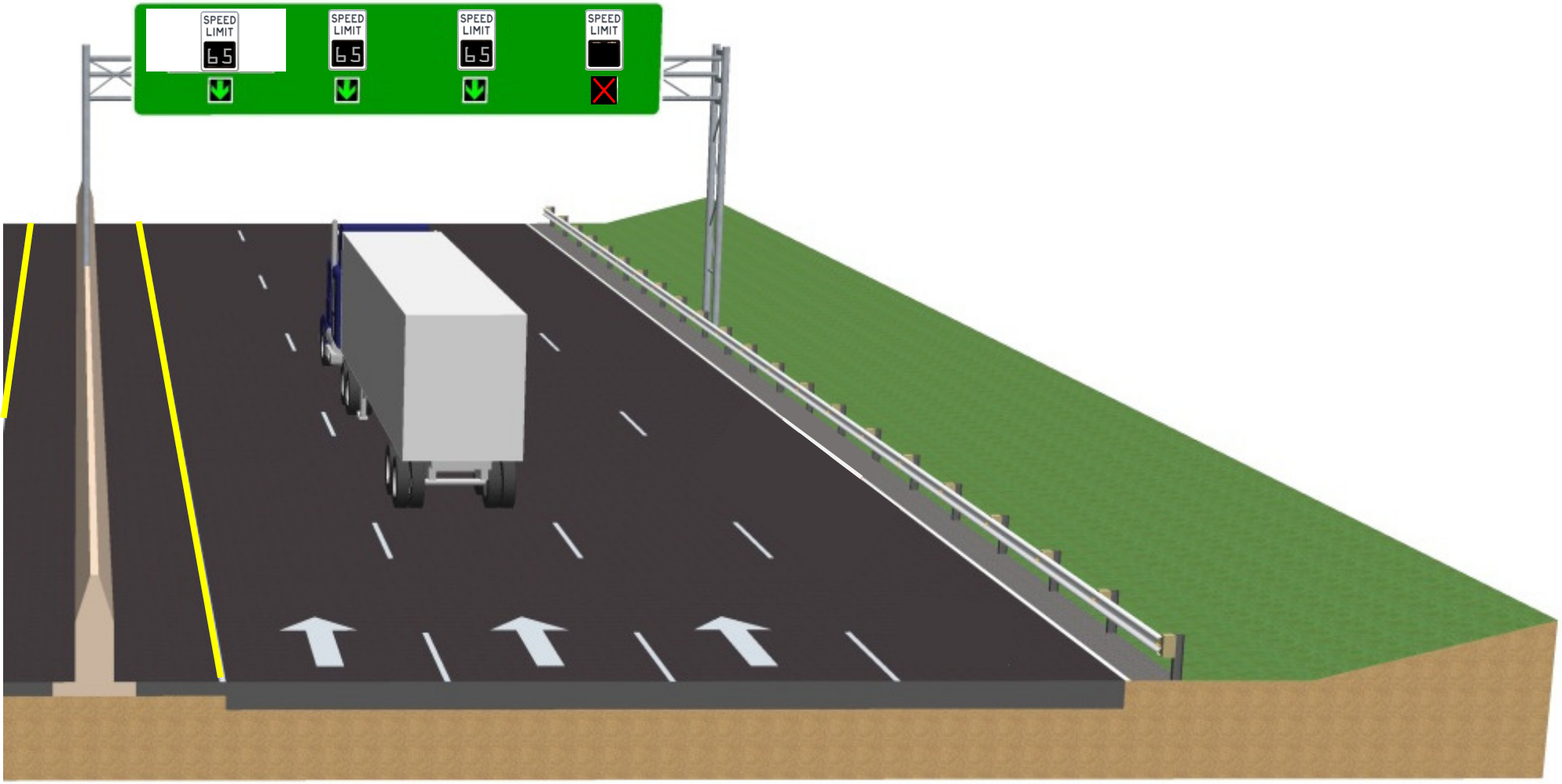
# Dynamic Flex Lanes – Typical Section BEFORE



# Dynamic Flex Lanes – Typical Section AFTER



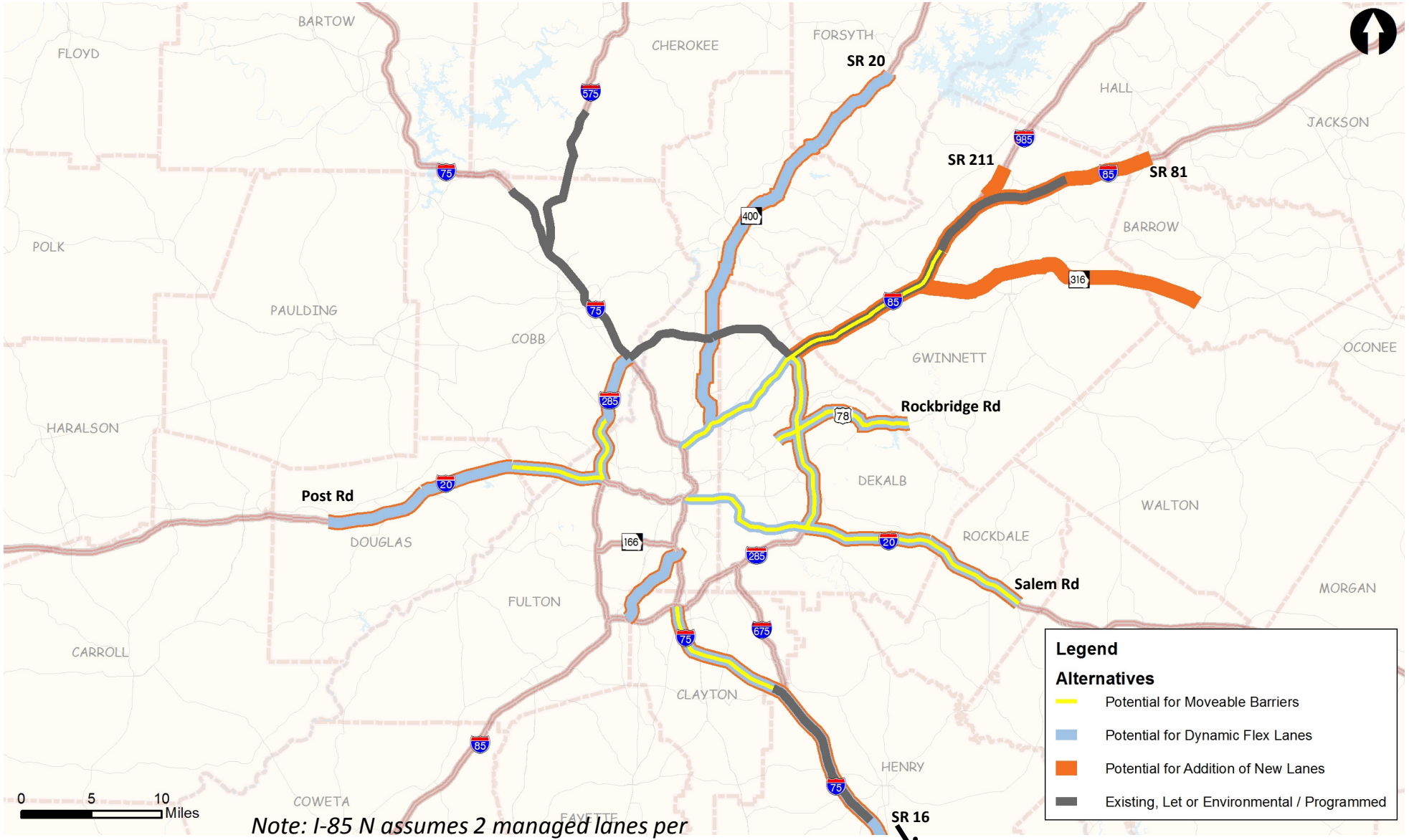
# ATMS Signage – Off-Peak



# Dynamic Flex Lane Characteristics

- Configurations
  - 1-Lane in each direction
  - Maintained existing lane widths and rebuilt outside shoulder to a new 12’ lane (for use during peak periods only) and 2’ outside shoulder
  - Separation through pavement stripings
  - Access type and locations
    - Slip ramp access to adjacent general purpose lanes spaced every 2-3 miles
- Operations/Analysis Periods
  - Both directions
  - Peak period operations

# Corridor Strategies Initially Evaluated




*Note: I-85 N assumes 2 managed lanes per direction from I-285 to Old Peachtree Rd.*

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# Corridor Strategy Prioritization

# Prioritization Structure Evaluation Criteria

**TRANSPORTATION MOBILITY**

- Vehicle and Person Throughput
- Changes in travel speeds or travel time savings
- Reduction of vehicle delay
- Facilitation of transit options

**FINANCIAL FEASIBILITY**

- Revenue/mile
- Cost/mile
- Project financing index

**SYSTEM CONNECTIVITY & ECONOMIC GROWTH**

- Managed lane system connectivity
- Connectivity to major employment centers
- Jobs accessed within 45 minutes of travel by car or transit

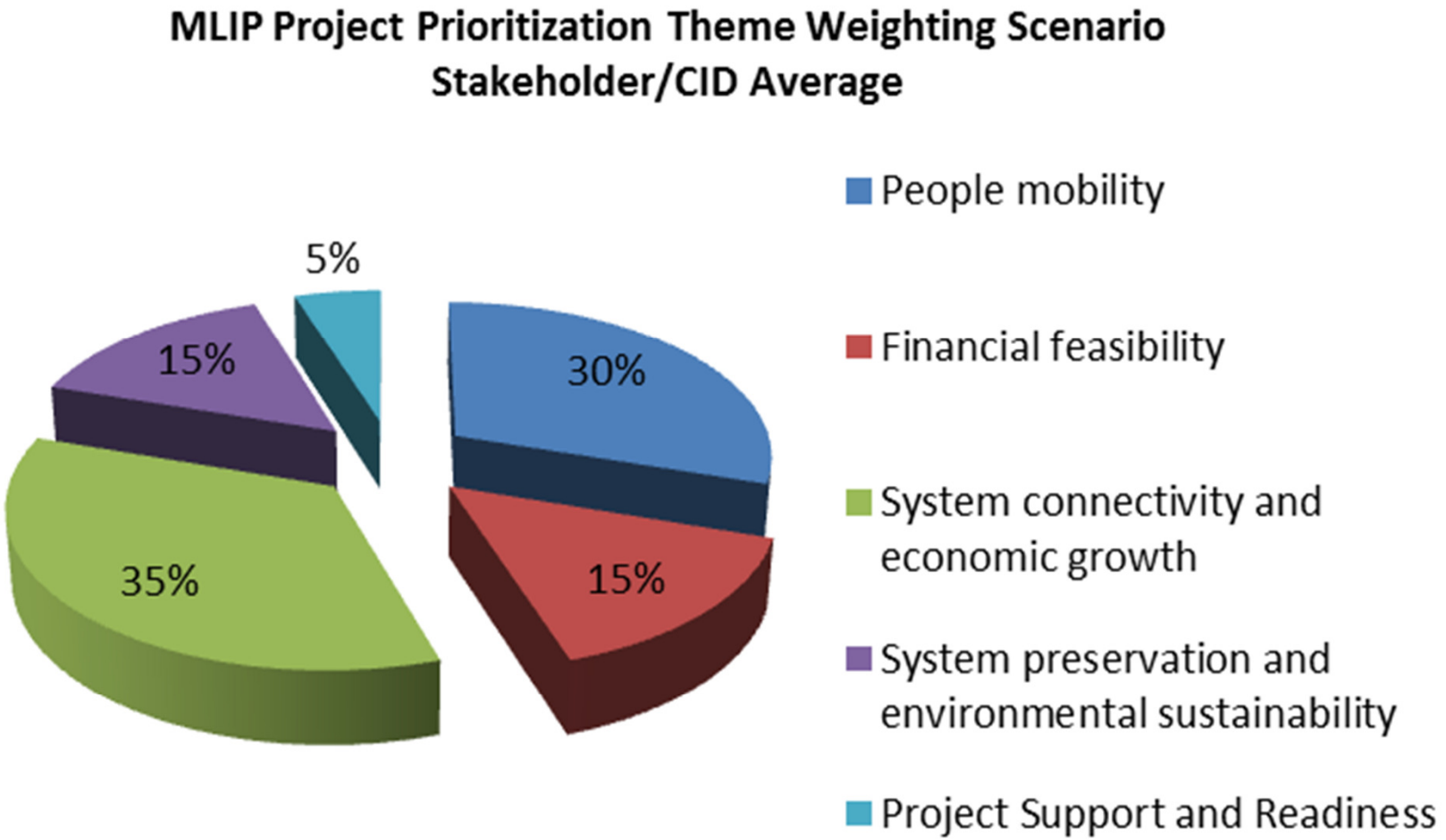
**SYSTEM PRESERVATION & ENVIRONMENTAL SUSTAINABILITY**

- System preservation
- Level of environmental impacts
- Flexible lane management

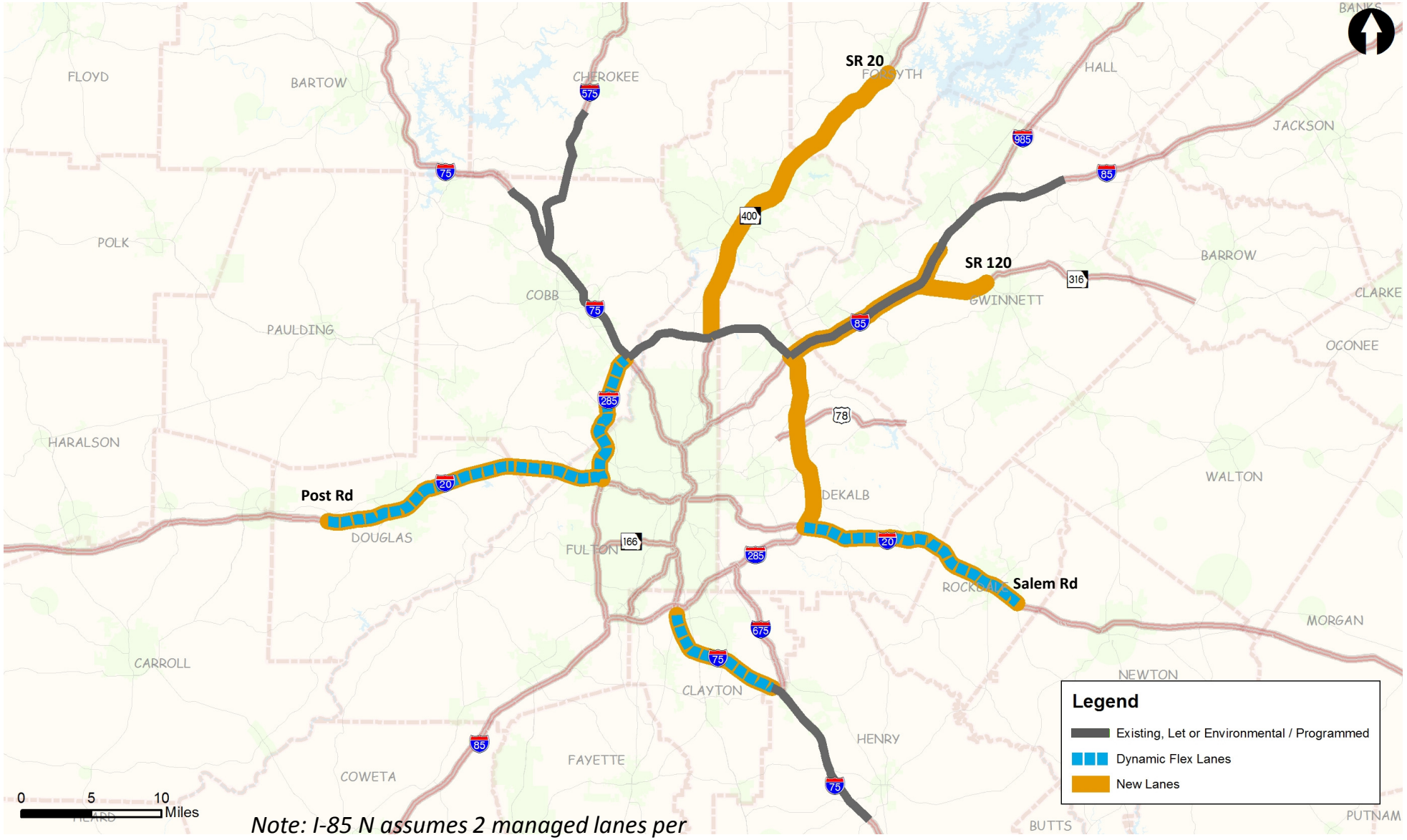
**PROJECT SUPPORT & READINESS**

- Project readiness
- General constructability and schedule

# MLIP Prioritization Structure - Weighting Scenario Analysis



# Identified Corridor Strategies




*Note: I-85 N assumes 2 managed lanes per direction from I-285 to Old Peachtree Rd.*

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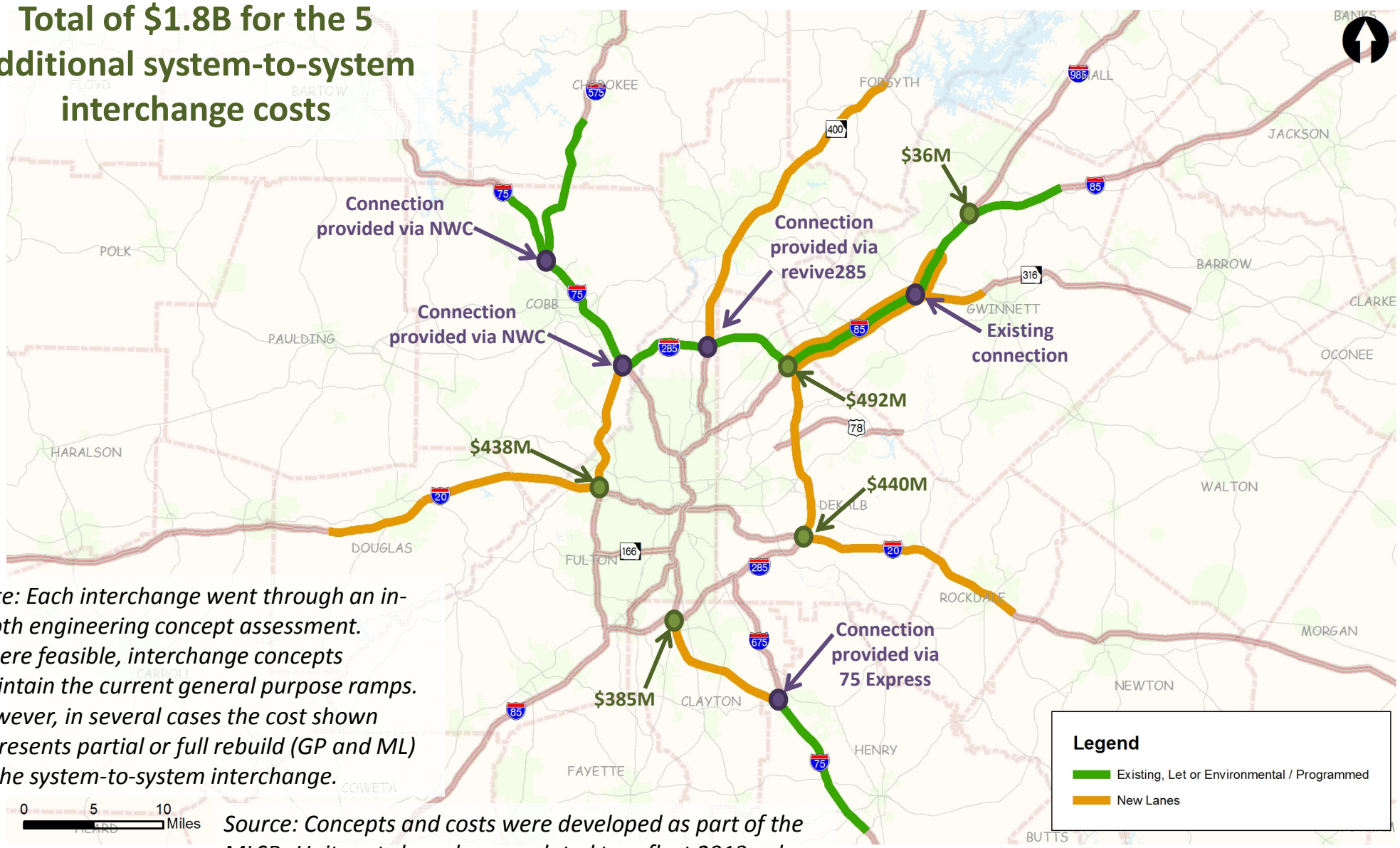
# Operational Analysis

## System-to-System Access & Corridor Performance

# Option 1: System-to-System Interchange Costs

**Total of $1.8B for the 5 additional system-to-system interchange costs**

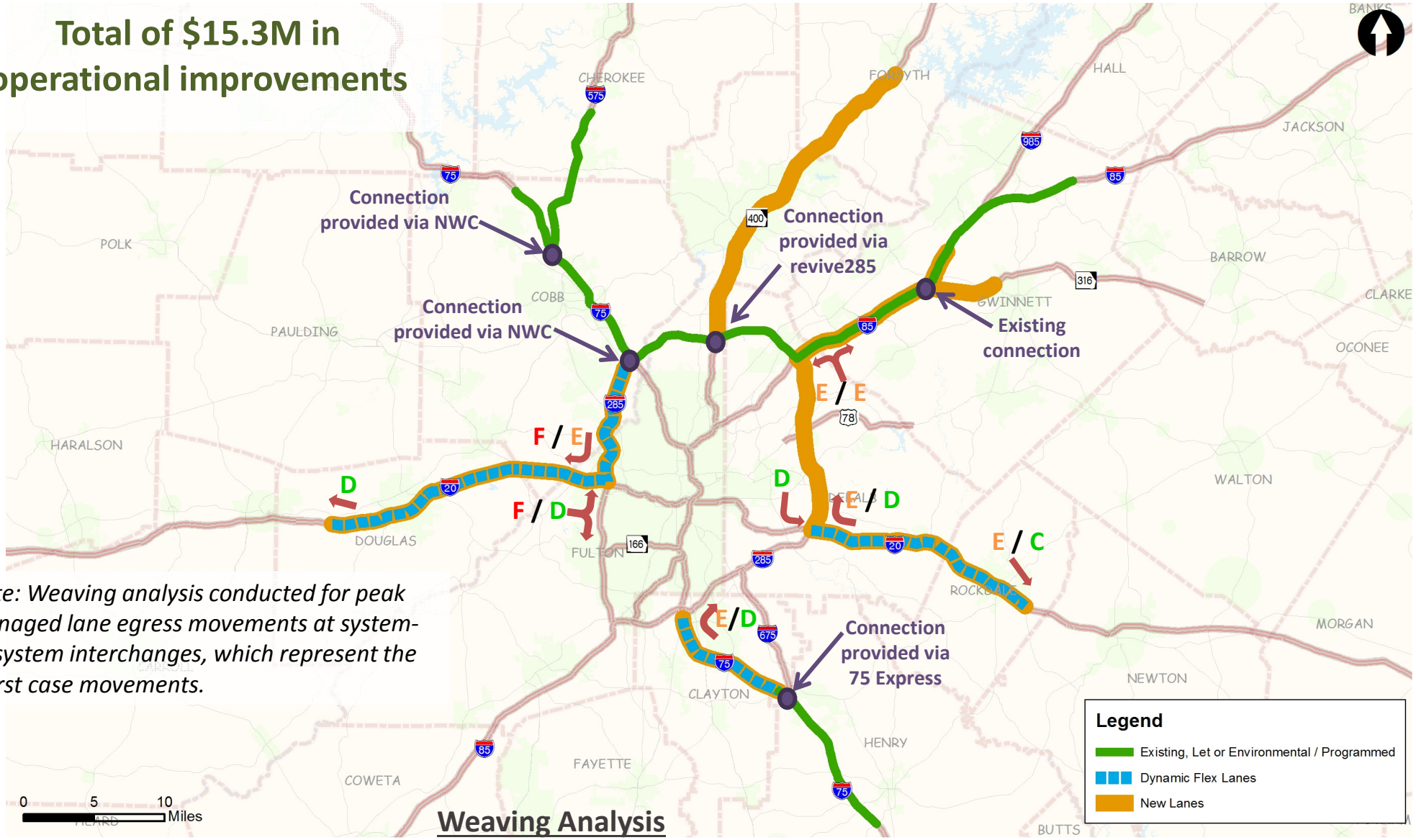



*Note: Each interchange went through an in-depth engineering concept assessment. Where feasible, interchange concepts maintain the current general purpose ramps. However, in several cases the cost shown represents partial or full rebuild (GP and ML) of the system-to-system interchange.*

*Source: Concepts and costs were developed as part of the MLSP. Unit costs have been updated to reflect 2013 values.*

# Option 2: Lower Cost Operational Improvements

**Total of $15.3M in operational improvements**




*Note: Weaving analysis conducted for peak managed lane egress movements at system-to-system interchanges, which represent the worst case movements.*

## Weaving Analysis

F/D – 2020 No Build LOS / 2020 Build LOS

# Weaving Analysis – Potential Improvements

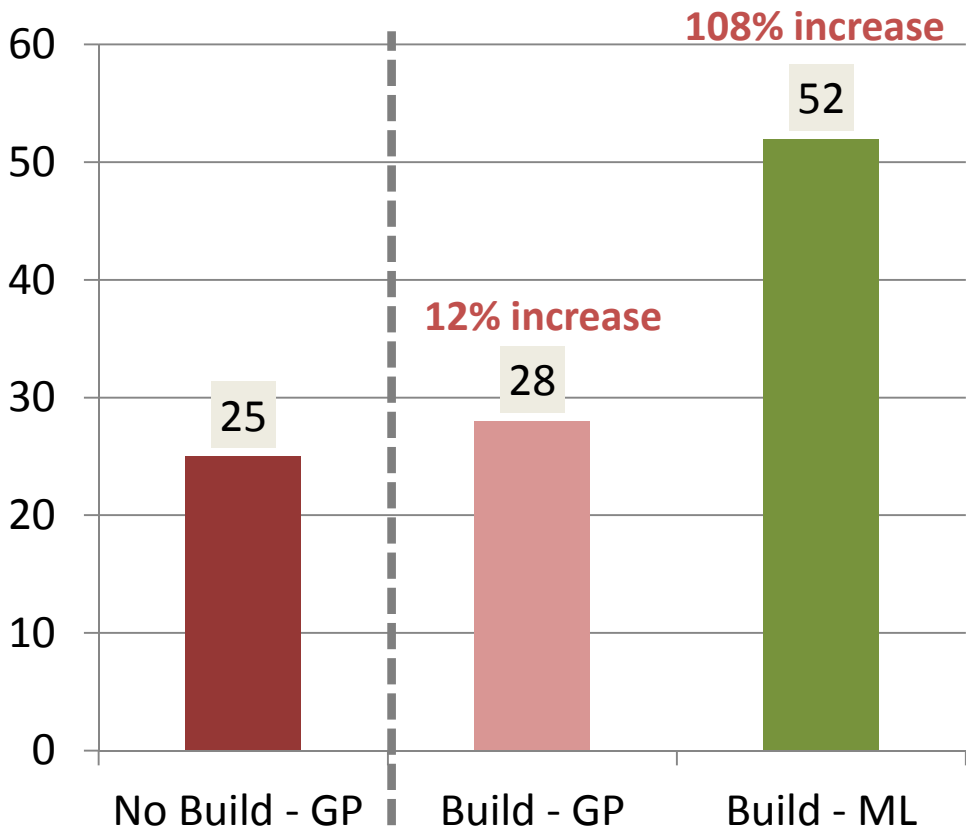
- Weaving analysis resulted in increased capital cost of **$15.3M**
- OPS projects necessary to achieve acceptable LOS
  - #15 – Extend flex lane to I-285E Exit with signing and striping modifications *(I-20E WB project, $2.08M)*
  - #18.1 – Extend flex lane to I-20 WB Exit *(I-20W WB project, $3.87M)*
  - #18.2 – Extend flex lane to new exit to I-285 *(I-20W EB project, $7.72M)*
  - #32.2 – Extend flex lane to I-85 exit with signing and striping modifications *(I-285E NB project, $0.46M)*
- Additional operational strategies necessary:
  - I-75S NB - Extend flex lane to SR 54 Exit with signing and striping modifications *($0.25M)*
  - I-20E EB - Extend flex lane to SR 162 Exit with signing, striping and widening modifications *($0.91M)*

# Corridor Performance – No Build Assumptions

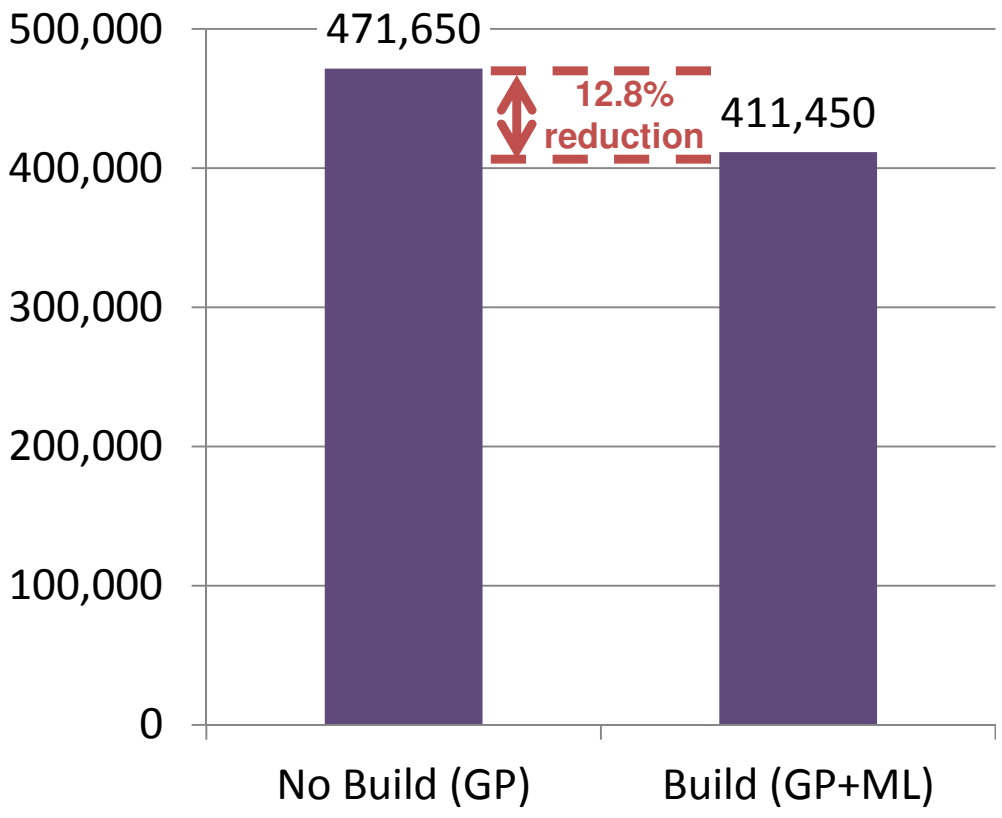
- No-Build Assumptions includes Managed Lanes on
  - HOV Inside I-285 (Existing)
    - 1 HOV lane in each direction where currently existing
  - I-75/I-575 NWC
    - 2/1 reversible ETL
  - I-75 South from SR 138 to SR 155
    - 2 reversible ETL
  - I-85 North from I-285 to Old Peachtree Rd
    - 1 HOT3+ in each direction
  - I-285 Top End
    - 2 ETL in each direction

# Corridor Performance – Changes in Speeds & Delay for New Lanes and Dynamic Flex Lanes

## 2040 Peak Period Travel Speed (mph)




## 2040 Total Vehicle Delay During AM & PM Periods (Hours)

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*Note: Build results include managed lane solutions along all study corridors.*

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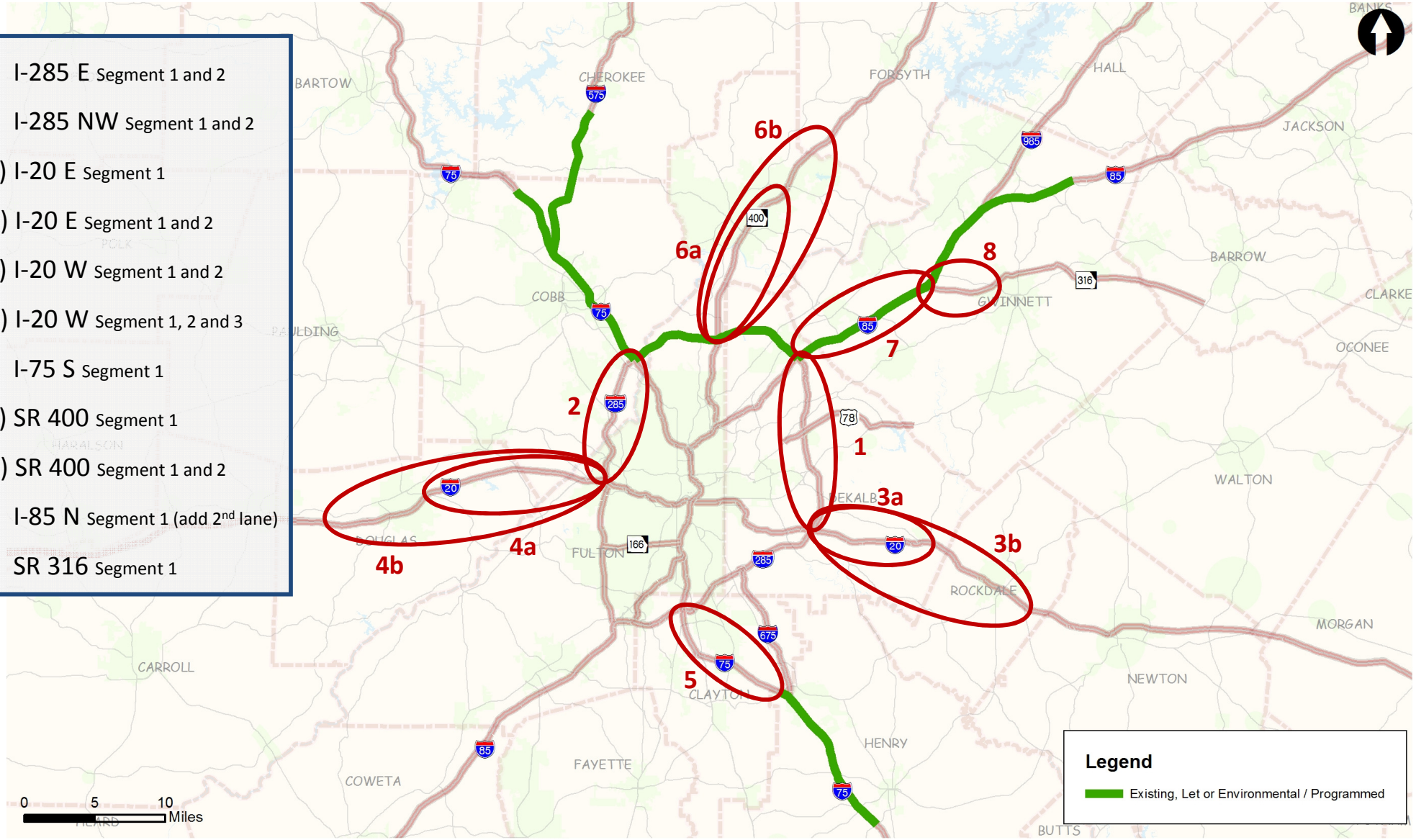
# Assumptions to Inform Financial Analysis

# Packages for Financial Analysis

1) I-285 E Segment 1 and 2
2) I-285 NW Segment 1 and 2
3a) I-20 E Segment 1
3b) I-20 E Segment 1 and 2
4a) I-20 W Segment 1 and 2
4b) I-20 W Segment 1, 2 and 3
5) I-75 S Segment 1
6a) SR 400 Segment 1
6b) SR 400 Segment 1 and 2
7) I-85 N Segment 1 (add 2nd lane)
8) SR 316 Segment 1



# Development of Traffic and Revenue

- Willingness-to-pay
  - GDOT's 2007/2010 stated preference survey
  - Mean value of time range $7 - $15 per hour
- Policies
  - Set toll rates to maximize performance (maintain ~45 mph in managed lane)
    - Therefore, traffic remains fairly consistent in the managed lanes between 2020 and 2040 while the demand for the lane increases over time
  - ETL (except for I-85 N, which was assumed to remain HOT3+)
  - All transit was allowed for free; however, no changes were made to routes or headways
- Revenue Forecasts
  - 2020-2040 revenue interpolated using 2020 and 2040 model results
  - Beyond 2040, 50% revenue growth rate was assumed
  - Ramp-up factors
    - Year 1 (65%); Year 2 (80%); Year 3 (90%); Year 4 (95%)

# Development of Capital Costs – Roadway

- Roadway Items
  - Grading Complete
  - Clearing & Grubbing
  - PCC Widening
  - Asphalt Widening
  - Asphalt Mill/Overlay
  - Pavement Demo
  - Concrete Barrier (Type 2)
  - Concrete Median
  - Sidewalk
  - Concrete Curb and Gutter
  - ROW
  - ROW Take
  - Guard Rail
- Structural Items
  - New Bridge
  - Bridge Removal
  - Bridge Widening
  - Retaining Walls
  - Soundwalls
- Drainage Items
  - Drainage Structures
  - Drainage Pipe
  - Paved Ditched/Flume
  - Rip Rap
- Traffic Items
  - Signal Timing adjustments
  - New Intersection Signal
  - Traffic Cameras
- Signing and Marking Items
  - Striping
  - Overhead Signs
  - Remove Overhead Signs
  - Retrofit Overhead Signs
  - Roadside Signs
  - Changeable Warning Signs
  - Remove Exist Solid Traffic Stripe
  - Remove Traffic Markings
  - Light Poles (Tolling Safety)
  - Light Poles (Large Mast)
  - Fiber Optic Line
- Erosion Control (+ MS4)
- Traffic Control

# Development of Capital Costs – Tolling

- Lane Equipment
- OCR Development and License Fee
- Mobilization
- System Integrator design, PM, testing and documentation
- Installation
- System Testing and Oversight
- Toll Host/Plaza Server
- Lane Software
- Generators
- ITS Equipment
- Testing

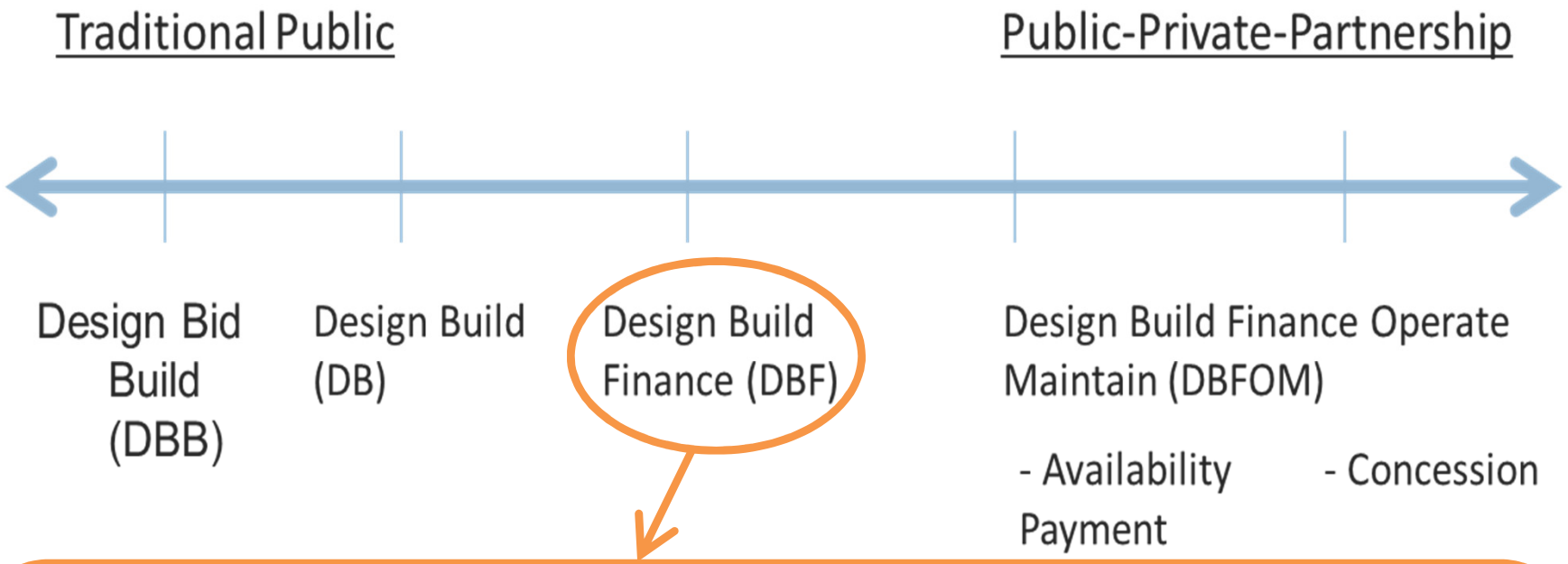
# Development of O&M Costs – Roadway

- HERO Maintenance Vehicle
- HERO Operators
- HERO Vehicles
- Asphalt Mill/Overlay
- Changeable Message Signs
- Changeable Message Sign Replacement
- Emergency Towing
- Snow & Ice Removal
- Special Events/Emergency Closures

# Development of O&M Costs – Tolling

- Tolling
  - Lane Equipment
  - Back Office Hosting Maintenance
  - ETC Lane Equipment Maintenance, Hosting, Software Maintenance
  - ITS Equipment
  - Generators
  - Toll Admin and Overhead
  - Annual Utilities
  - NaviGAtor Upgrade Maintenance
  - SRTA Integration Maintenance
  - WAN Access
  - R&R – Capital Replacements
- Customer Service Center Costs
  - Electronic Toll Collection Processing Fee (per transaction)
  - Credit Card Fees
  - Image Review Costs
  - DMV Lookup Costs
  - Violation Notice Costs
  - Collection Costs

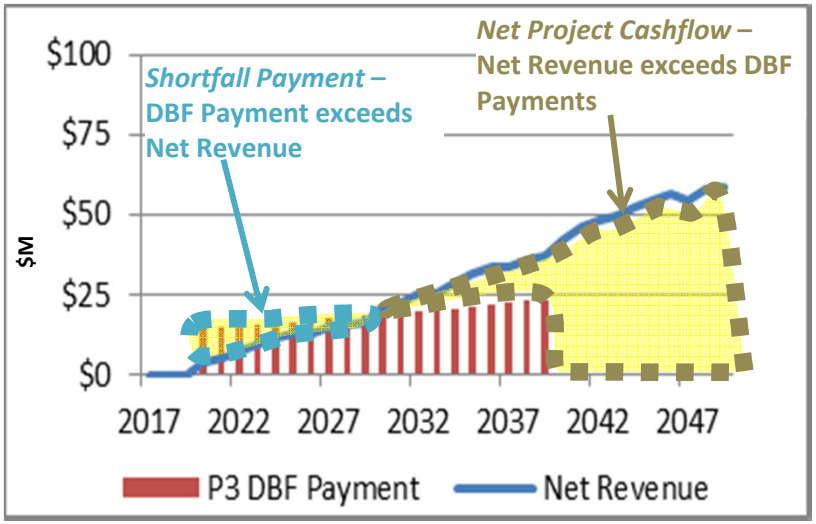
# Project Delivery Spectrum



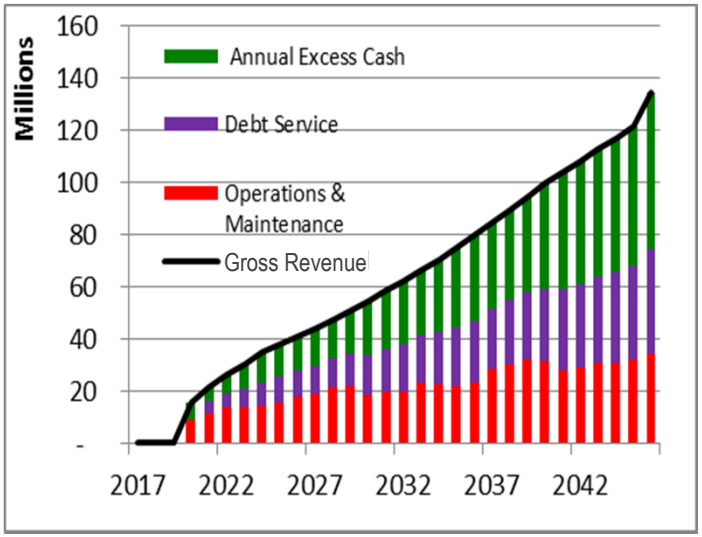

- Typically for gap financing or cashflow management
- Construction term loans are common
- Final term can vary
- Financing amount (% of construction cost) can vary
- Desired output (one page summaries, narratives explaining structures, etc.)

# Input Assumptions for Packages

## DBF Structure




## Toll Backed Bonds Structure




## Assumptions

- Upfront Costs - 45% or 70%
  - Milestone Payments
  - Substantial Completion Payments
- DBF Finance - 55% or 30%
- DBF Payback - 10 year or 20 year
- Debt Rate – 4.5%

## Financial Levers

- Toll Revenue Bonds
- TIFIA
- Private Activity Bonds (PAB)
- Coverage
- Borrowing Rate
- Debt-to Equity Ratio
- Internal Rate of Return (IRR)
- Subsidy Options
- Partnerships

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# Results of Financial Analysis

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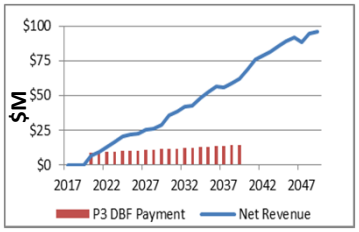
# 1) I-285 E Segment 1 & 2

## I-285 E from I-20 E to I-85 N

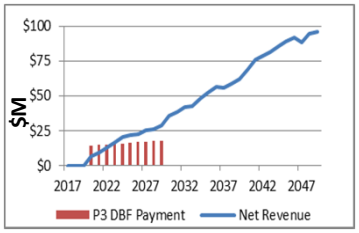
| | | | |
|---|---|---|---|
| Length | 13.4 miles | Alternative | New Lanes |
| Capital Costs (2018$) | $186 M | 30-Yr Net Revenue (Gross revenue – O&M) | $1,535 M |

45% Upfront w/ 20-Yr Payback



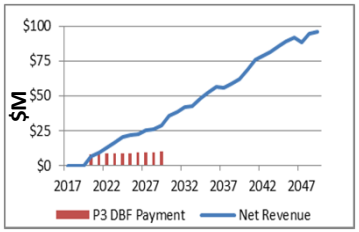

| | |
|---|---|
| Public Upfront Pmts (45% Upfront) | $84 |
| Total DBF Pmts (20 years) | $230 |
| Total Shortfall Payments* | $3 |
| Net Project Cashflow (Net Revenue – DBF Payments) | $1,305 |
| *Net Cashflow / Capital* | *7.0* |

45% Upfront w/ 10-Yr Payback



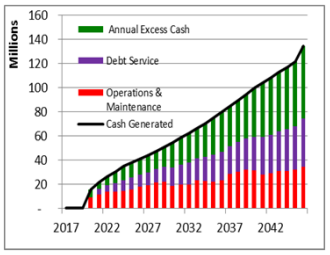

| | |
|---|---|
| Public Upfront Pmts (45% Upfront) | $84 |
| Total DBF Pmts (10 Years) | $162 |
| Total Shortfall Payments* | $16 |
| Net Project Cashflow (Net Revenue – DBF Payments) | $1,373 |
| *Net Cashflow / Capital* | *7.4* |

70% Upfront w/ 10-Yr Payback




| | |
|---|---|
| Public Upfront Pmts (70% Upfront) | $130 |
| Total DBF Pmts (10 years) | $90 |
| Total Shortfall Payments* | $2 |
| Net Project Cashflow (Net Revenue – DBF Payments) | $1,445 |
| *Net Cashflow / Capital* | *7.8* |

Toll Revenue Analysis[1]

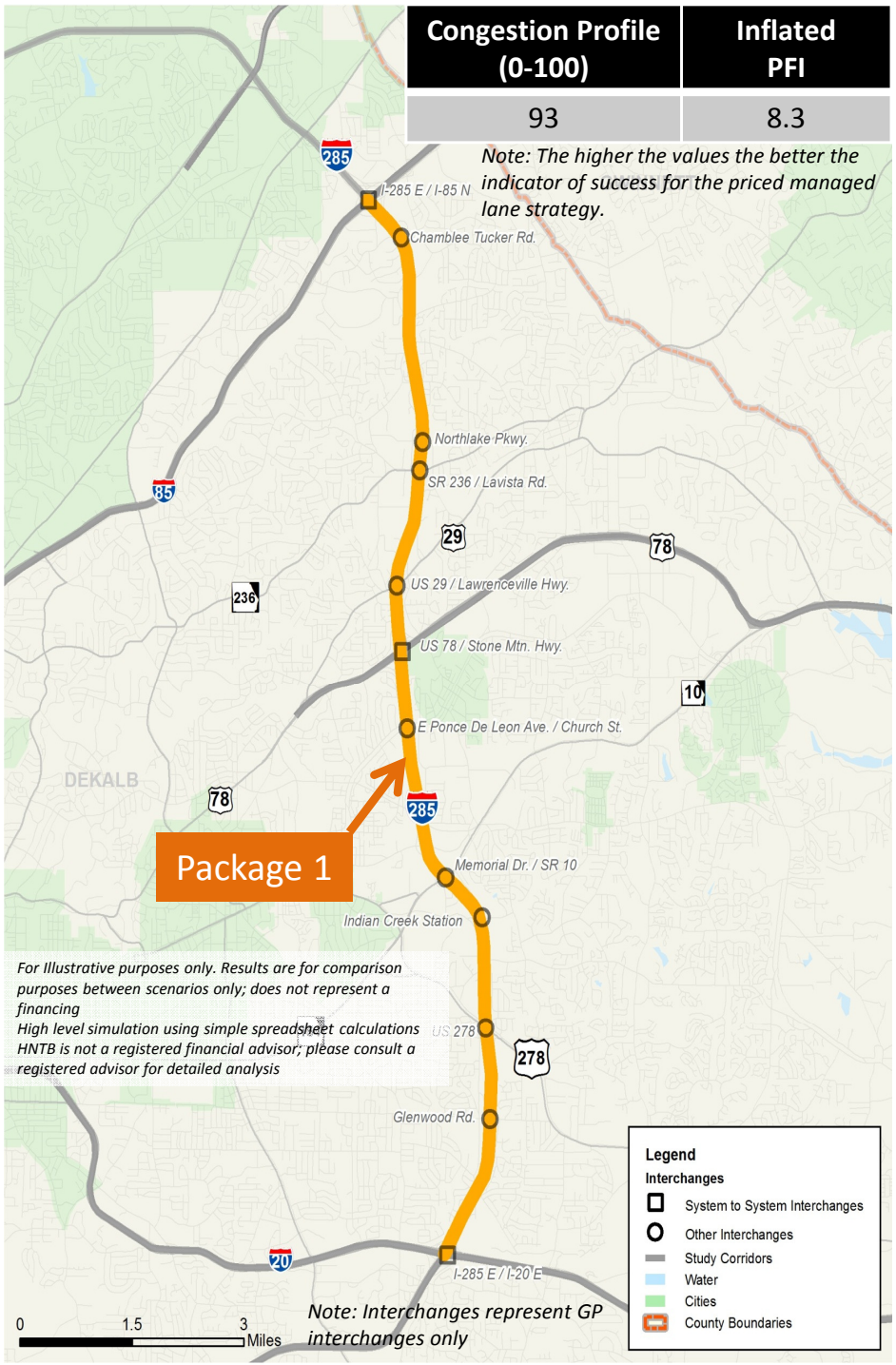



| | |
|---|---|
| 30-Yr Gross Revenue | $2,280 |
| Net Project Cashflow | $1,013 |
| Debt Service | $522 |
| *Net Upfront Proceeds (PV)* | *$153* |
| Net O&M | $745 |
| *Financial Feasibility %* *(Proceeds / Capital Costs)* | *82%* |

*Note: $ are inflated to year of expenditure*
**Total GDOT subsidy to cover years when annual toll revenue is insufficient to meet that year's DBF payment*

| Congestion Profile (0-100) | Inflated PFI |
|---|---|
| 93 | 8.3 |

*Note: The higher the values the better the indicator of success for the priced managed lane strategy.*




*For Illustrative purposes only. Results are for comparison purposes between scenarios only; does not represent a financing*
*High level simulation using simple spreadsheet calculations HNTB is not a registered financial advisor; please consult a registered advisor for detailed analysis*

*Note: Interchanges represent GP interchanges only*

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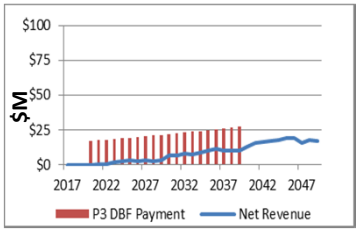
# 5) I-75 S Segment 1

## I-75 S from I-285 S to SR 138

| | | | |
|---|---|---|---|
| Length | 10.6 miles | Alternative | New Lanes |
| Capital Costs (2018$) | $354 M | 30-Yr Net Revenue (Gross revenue – O&M) | $277 M |

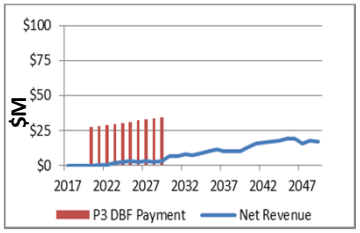
**Toll Revenue Analysis[1]**

**45% Upfront w/ 20-Yr Payback**



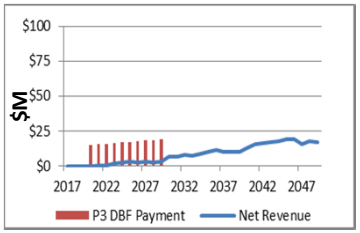

| | |
|---|---|
| Public Upfront Pmts (45% Upfront) | $159 |
| Total DBF Pmts (20 years) | $439 |
| Total Shortfall Payments* | $330 |
| Net Project Cashflow (Net Revenue – DBF Payments) | -$161 |
| *Net Cashflow / Capital* | *-0.5* |

**45% Upfront w/ 10-Yr Payback**




| | |
|---|---|
| Public Upfront Pmts (45% Upfront) | $159 |
| Total DBF Pmts (10 Years) | $309 |
| Total Shortfall Payments* | $289 |
| Net Project Cashflow (Net Revenue – DBF Payments) | -$32 |
| *Net Cashflow / Capital* | *-0.1* |

**70% Upfront w/ 10-Yr Payback**

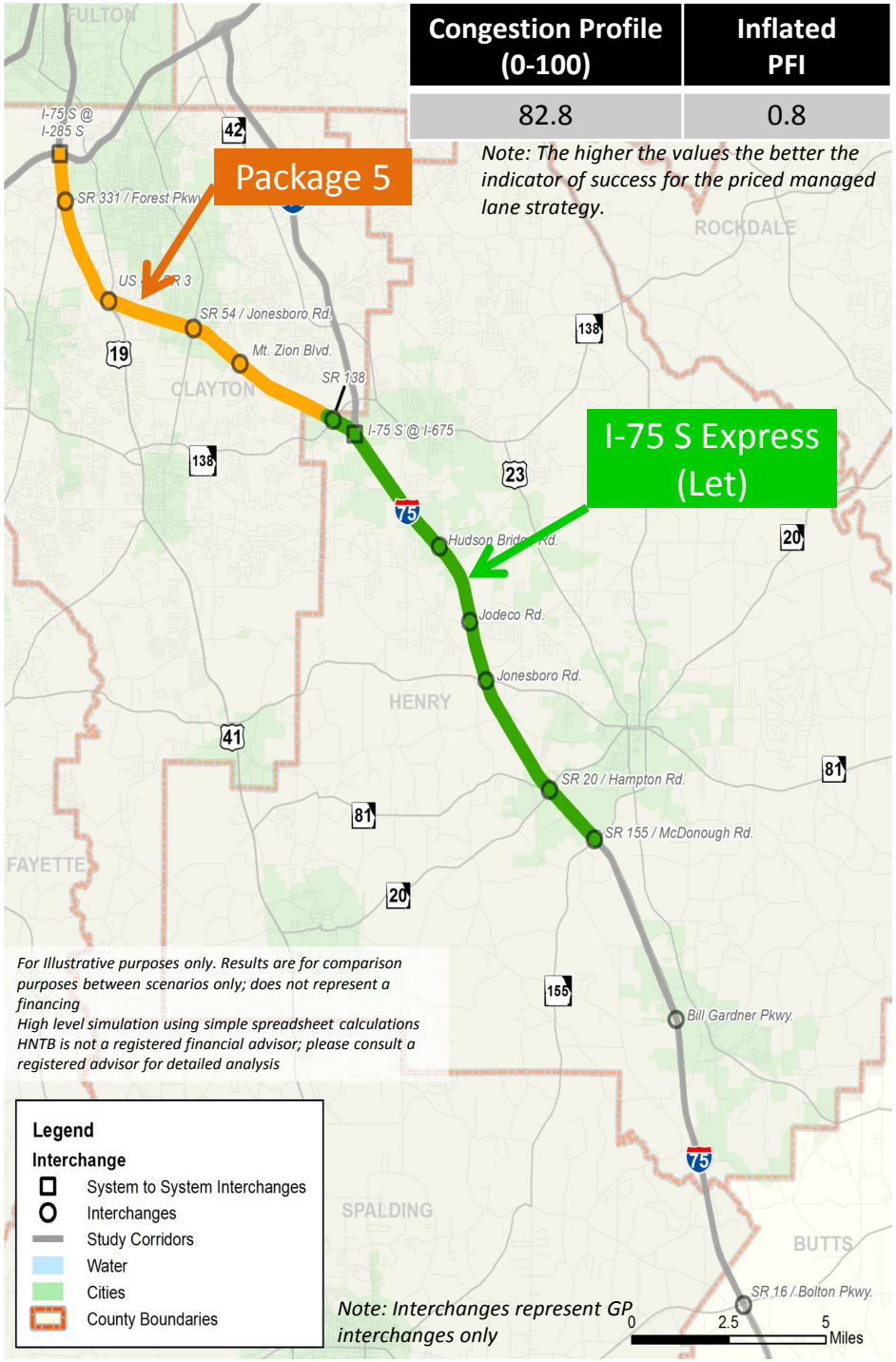



| | |
|---|---|
| Public Upfront Pmts (70% Upfront) | $248 |
| Total DBF Pmts (10 years) | $171 |
| Total Shortfall Payments* | $151 |
| Net Project Cashflow (Net Revenue – DBF Payments) | $107 |
| *Net Cashflow / Capital* | *0.3* |

*Note: $ are inflated to year of expenditure*
**Total GDOT subsidy to cover years when annual toll revenue is insufficient to meet that year's DBF payment*

| Congestion Profile (0-100) | Inflated PFI |
|---|---|
| 82.8 | 0.8 |

*Note: The higher the values the better the indicator of success for the priced managed lane strategy.*




*For Illustrative purposes only. Results are for comparison purposes between scenarios only; does not represent a financing*
*High level simulation using simple spreadsheet calculations*
*HNTB is not a registered financial advisor; please consult a registered advisor for detailed analysis*

Georgia Department of Transportation

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**MANAGED LANES**

Implementation Plan

# Findings

# Corridor Strategy Findings

| Corridor | Segment | Termini | Length (miles) | New Lanes Revenue and Costs for Each Segment ($ in Millions, 2013) | | | | Dynamic Flex Lanes Revenue and Costs for Each Segment ($ in Millions, 2013) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 30-Year Gross Revenue | Capital Cost | 30-Year O&M Cost | PFI | 30-Year Gross Revenue | Capital Cost | 30-Year O&M Cost | PFI |
| I-20 E | Segment 1 | I-285 E to SR 124 | 9.8 | $730 | $268 | $239 | 1.8 | $695 | $80 | $225 | 5.9 |
| I-20 W | Segment 1 & 2 | I-285 W to SR 92 | 11.0 | $690 | $366 | $300 | 1.1 | $568 | $191 | $301 | 1.4 |
| I-285 E | Segment 1 & 2 | I-20 E to I-85 N | 13.0 | $1,247 | $164 | $419 | 5.0 | - | - | - | - |
| I-285 W | Segment 1 & 2 | I-75 N to I-20 W | 8.9 | $660 | $311 | $297 | 1.2 | $841 | $137 | $321 | 3.8 |
| I-75 S | Segment 1 | I-285 S to SR 138 | 11.0 | $338 | $313 | $194 | 0.5 | - | - | - | - |
| I-85 N | Segment 1 | I-285 N to Old Peachtree Rd | 17.0 | $1,053 | $333 | $302 | 2.3 | - | - | - | - |
| SR 316 | Segment 1 | I-85 to SR 120 | 6.5 | $256 | $151 | $172 | 0.6 | $333 | $148 | $182 | 1.0 |
| SR 400 | Segment 1 & 2 | I-285 N to McFarland | 17.0 | $1,236 | $497 | $412 | 1.7 | - | - | - | - |
| **Total** | | | **117.6** | **$6,210** | **$2,403** | **$2,335** | **1.6** | **$2,437** | **$556** | **$1,029** | **2.5** |

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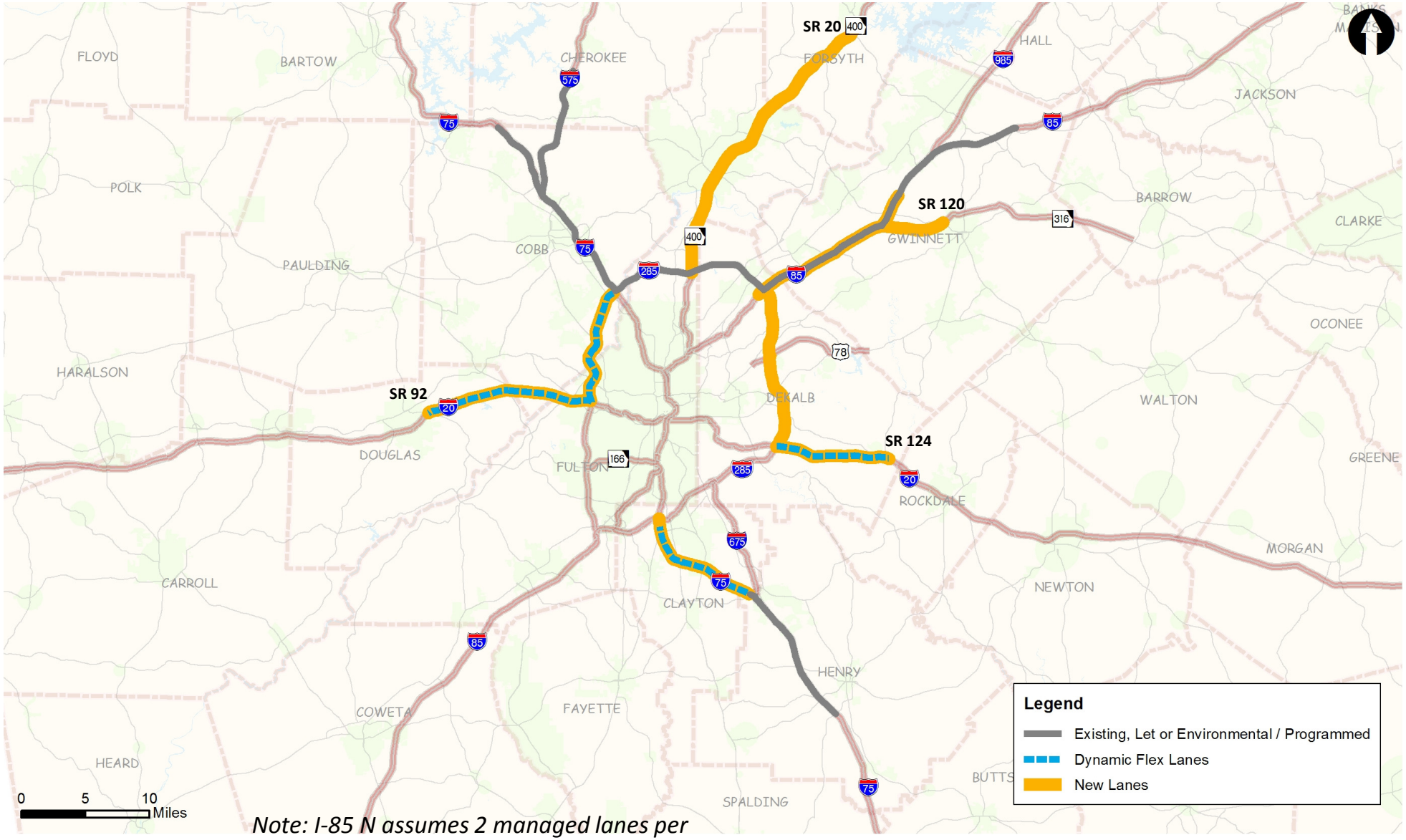
*1) Total Capital cost includes roadway capital cost and tolling capital cost.*
*2) Total 30-year O&M cost includes roadway O&M, tolling O&M and transaction cost.*
*3) The Project Financebility Index (PFI) is calculated as: [30-year gross revenue] minus [30-year O&M costs for both roadway and toll equipment] divided by [roadway and tolling capital costs].*

# Corridor Strategy Findings




*Note: I-85 N assumes 2 managed lanes per direction from I-285 to Old Peachtree Rd.*

# Next Steps

- Complete Documentation
- Atlanta MPO to consider corridor strategies as part of current RTP project prioritization process

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Atlanta Regional
MANAGED LANES
Implementation Plan

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